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Harvestmen (Opiliones) from the Mascarene Islands and resurrection of the family Zalmoxidae

by

Wojciech Staręga

(Natal Museum, Pietermaritzburg, South Africa)

ABSTRACT

Four species of Opiliones from Mauritius and one from Réunion are listed. The genital organs of *Zalmoxomma occidentalis* Roewer, *Hinzuanius mauriticus* Roewer, *Strandia ceylonensis* (Karsch) and *Zalmoxis austera* Hirst (from New Guinea—for comparison) are illustrated for the first time. The family Zalmoxidae is removed from the synonymy of Phalangodinae and is redefined. The biantid genus *Hinzuanius* is also discussed and an amplified list of included species together with new combinations and new synonymies of several specific and generic names is provided. The systematics of Assamiidae and problems with systematics and nomenclature of Gagrellinae are commented on.

New synonyms:

Acrobiantes Roewer, 1915, *Biantica* Roewer, 1949, *Biantula* Roewer, 1949, *Biantidius* Roewer, 1949, *Hovabiantes* Lawrence, 1959 all = *Hinzuanius* Karsch, 1880.

Acrobiantes brevispinus Lawrence, 1959 & *Acrobiantes minor* Lawrence, 1959 = *Hinzuanius pardalis* (Lawrence, 1959).

Acrobiantes nigroannulatus Lawrence, 1959 = *Hinzuanius gracilis* (Roewer, 1949).

Biantes bicolor Pocock, 1903 = *Hinzuanius flaviventris* (Pocock, 1903)?.

Biantes scaber Lawrence, 1959 = *Hinzuanius pauliani* (Lawrence, 1959).

Hinzuanius hildebrandti Roewer, 1912, *Hovabiantes immaculatus* Lawrence, 1959, *Hovabiantes simplicidens* Lawrence, 1959 & *Hovabiantes vachoni* Lawrence, 1959 = *Hinzuanius vittatus* (Simon, 1885).

Probiantes mauriticus Roewer, 1949 = *Hinzuanius mauriticus* Roewer, 1927.

New combinations:

Acrobiantes littoralis Lawrence, 1959, *Acrobiantes pardalis* Lawrence, 1959, *Biantes milloti* Fage, 1946, *Biantes tenebrosus* Lawrence, 1959, *Biantes vittatus* Simon, 1885, *Biantica comorensis* Roewer, 1949, *Biantica madagassis* Roewer, 1949, *Biantula gracilis* Roewer, 1949, *Hovabiantes pauliani* Lawrence, 1959—all transferred to *Hinzuanius*.

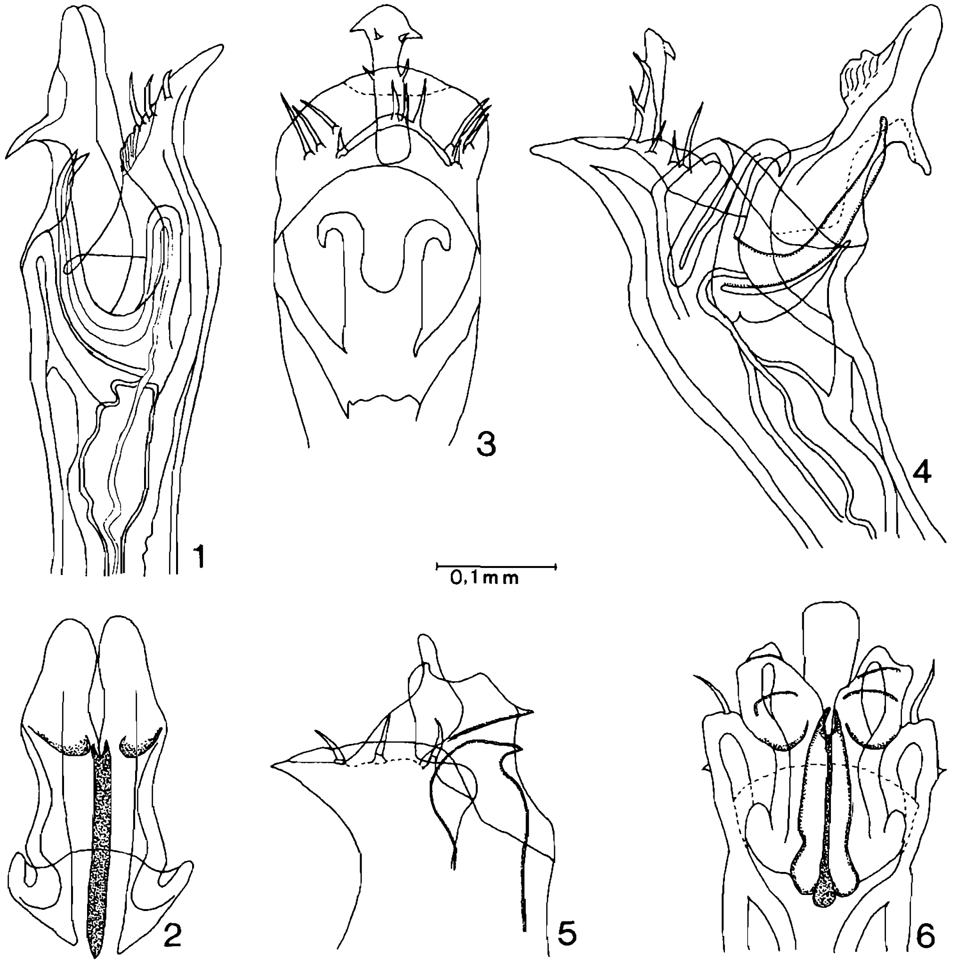
New lectotype designation for *Hinzuanius hildebrandti* Roewer, 1912 (ZMB 3793).

The fauna of the Mascarene Islands is very poorly known. Ten species have been described or listed (seven from Mauritius and three from Réunion), but since none were classified on the basis of genital morphology, their affinities remained more or less obscure. It was therefore of interest for me to find, in the undetermined material of the Natal Museum, a jar labelled 'Opiliones from Mauritius and Réunion'. It contained only six samples with scarcely legible labels: five from Mauritius and one from Réunion. The material proved to belong to the following four species.

Zalmoxomma occidentalis Roewer, 1949

Mauritius: Mont Cocotte (20°26′S:57°28′E), 29.ix.1957, leg. P. Remy—1 ♂ (NMSA 14299).

Compared (by myself) with the type-series (SMF R II/6033/158—Mauritius—2 ♂). Species described in Phalangodidae-Phalangodinae, but its genital morphology (Figs 1–4) indicates that it should belong to a different family.



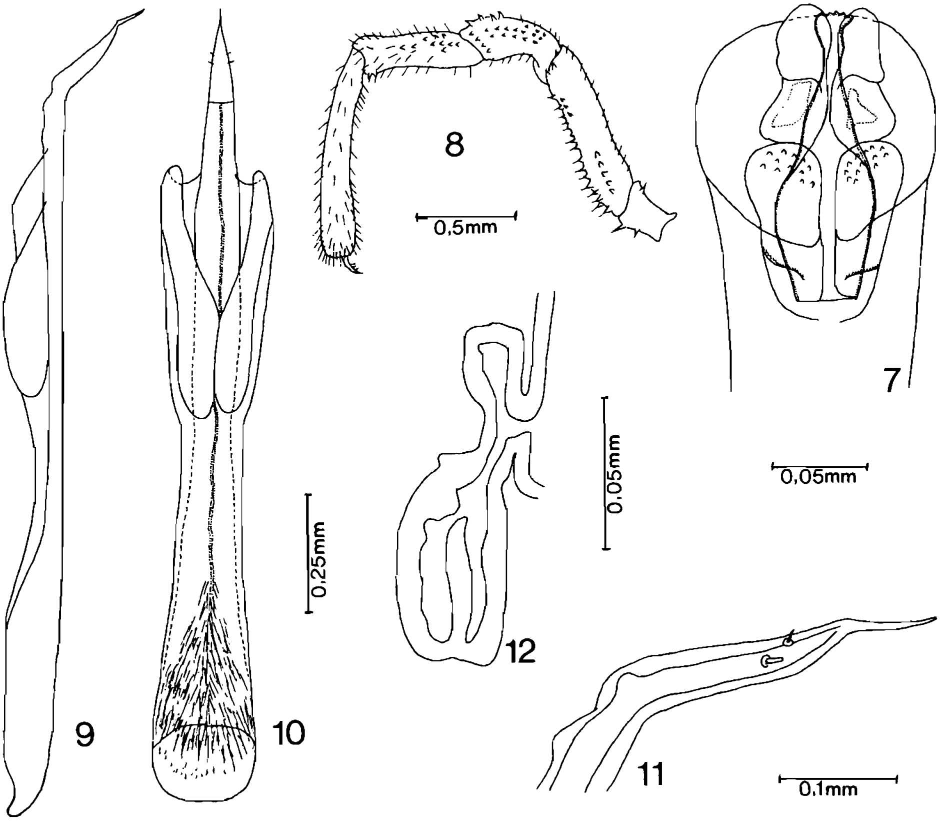
Figs 1–6. 1–4. *Zalmoxomma occidentalis* Roewer: 1. Tip of penis, lateral view. 2. Conductors and stylus, dorsal view. 3. Ventral plate, ventral view. 4. Tip of expanded penis, lateral view. 5–6. *Zalmoxis austera* Hirst (New Guinea: Simbang, C. F. Roewer det., SMF 1664—for comparison), tip of penis. 5. Lateral. 6. Dorsal.

Hinzuanius mauriticus Roewer, 1927

Probiantes mauriticus Roewer, 1949, **syn. n.**

Mauritius: Mont Cocotte (20°26'S:57°28'E), 29.ix.1957, leg. P. Remy—4♂, 2 j (NMSA 14298); Mont Le Pouce (20°12'S:57°31'E), 3.x.1957, leg. P. Remy—3♂, 2♀, 1 j (NMSA 14302).

My material was compared with the holotype of *H. mauriticus* (SMF R II/85/8—Mauritius—♂) and found to be conspecific. The holotype and additional material (SMF R II/6031/33—Mauritius: 'La Ponce'—about 45 ad. specimens) were in turn compared with the holotype of *Probiantes mauriticus* Roewer (SMF R II/1564/20—Mauritius—♀)—which also belongs to the same species.



Figs 7–12. 7. *Hinzuanius mauriticus* Roewer, tip of penis, dorsal view. 8–12. *Strandia ceylonensis* (Karsch). 8. Male pedipalp, mesal view. 9. Penis, lateral view. 10. Penis, ventral view. 11. Glans, lateral view. 12. Receptaculum seminis.

Maccabeesa lawrencei Roewer, 1936

Mauritius: Pamplemousses (20°06′S:57°34′E), 30.ix.1957, leg. P. Remy—6 ♀ (NMSA 14301); Grotte de La Louise nr. Riviere Noire (20°21′S:57°22′E), 11.x.1957, leg. P. Remy—4 ♀ (NMSA 14303); Riviere Noire (20°21′S:57°22′E), xii.1958, leg. R. Paulian—2 ♀ (NMSA 14304).

The material has been compared with what has been found of the type-series (SMF R II/6036/45—Mauritius: Maccabees—4 ♀) and is clearly conspecific with it.

Strandia ceylonensis (Karsch, 1891)

Réunion: Mare Longue (21°22′S:55°45′E), 1957, leg. P. Remy—7 ♂, 4 ♀ (NMSA 14297); Ravine à Malheur (20°55′S:55°23′E), *ca.* 10 km W of St. Denis, leaf litter at base of rock face beside road (D 41), 21.ix.1988, leg. D. Herbert & R. Kilburn—3 j (NMSA 15359). Mauritius: Mont Cocotte (20°26′S:57°28′E), 29.ix.1957, leg. P. Remy—1 ♂ (NMSA 14300).

These are the first records of the species from Réunion, previously it was known from Ceylon and Mauritius only. It was probably introduced to the Mascarene

Islands. The Natal Museum specimens agree well with a comparative series from Ceylon (Peradenia, C. F. Roewer det.—SMF R I/132—19 ad.).

GENERAL REMARKS

The Phalangodinae (or even Phalangodidae) constitute a small group of Holarctic genera (Martens 1986 & pers. comm.), all previously included taxa from other regions need revision and regrouping in a more natural system. Some subfamilies have already been removed (Mello-Leitão 1938) from Roewer's (ie. 1923 1949*a b*), very broad concept of the family and are now universally accepted as separate families (Biantidae, Podoctidae). The penis structure of *Zalmoxomma occidentalis* does not correspond with the basic plan and function principle presented by Martens (1986) for either Phalangodidae or any other family. The genus and species must therefore belong elsewhere. Some morphological characters have led me to the conclusion that this taxon could be related to *Zalmoxis* Sörensen with numerous nominal species from the islands of South-East Asia, Oceania and the continent of Australia. A comparison with *Zalmoxis austera* Hirst from New Guinea confirmed my deduction. *Zalmoxis* was given separate family status by Sörensen (1886) ['Zalmoxioidae'], but this was synonymised under Phalangodidae Simon, 1879 by Roewer (1912 1923) and has not been used since. The name is, however, available and is here resurrected.

Zalmoxidae Sörensen, 1886

Type-genus: *Zalmoxis* Sörensen, 1886 [type-species: *Zalmoxis robusta* Sörensen, 1886—Fiji Is., designated by Roewer (1923)—first species mentioned].

The family is redefined as follows: First two areae of scutum fused, without dividing transversal furrow. Eye tubercle low, broader than long, unarmed or with small denticles. Stigmata visible. Tarsi III and IV with smooth claws, without scopula or other structures. Tibia IV of ♂ incrassate and strongly armed. Penis structure: Stylus protected and led by two dorsal conductors; ventral plate with a single subterminal apophysis. Conductors at rest located along penis axis thus making its tip; subterminal apophysis hidden between conductors and ventral plate. When expanded conductors form a nearly right angle with penis axis and subterminal apophysis clearly visible protruding from ventral plate. Stylus remains hidden between conductors and is probably exposed just before copulation—possibly through some action of its basal hooked appendices. Structure and function of penis similar to the family Triaenonychidae (at least in the case of its South African genera) but the triaenonychid penis is muscular while the zalmoxid one is hydraulic.

The following nominal genera share these characteristics (the genital morphology is known only in *Zalmoxis* and *Zalmoxomma*) and are considered to belong here: *Acrozalmoxis* Roewer (New Guinea), *Bogania* Forster (New South Wales), *Papuastus* Roewer (New Guinea), *Zalmoxis* Sörensen (Java, Celebes, Philippines, Mariana Is., Caroline Is., Marshall Is., Bismarck Archip., New Guinea, Dauan and Mulgrave Is. in Torres Strait, North and East Queensland, New South Wales, New

Caledonia, Fiji Is.) and *Zalmoxomma* Roewer (Mauritius). Several other genera have been synonymised with *Zalmoxis* by Goodnight & Goodnight (1957).

Distribution: Mauritius, Java, Celebes, Philippines, Mariana Is., Caroline Is., Marshall Is., Bismarck Archipelago, New Guinea, Torres Strait Is., Queensland, New South Wales, New Caledonia, Fiji Is.

The systematic position of the following other genera previously included in Phalangodinae is obscure: *Biconibunus* Roewer (Singapore), *Bunofagea* Lawrence (Madagascar), *Buparellus* Roewer (Burma, Thailand), *Bupares* Thorell (Burma, Thailand, Malaya), *Gjellerupia* Roewer (New Guinea), *Heterobabrius* Roewer (Malaya, Singapore), *Istithaeus* Roewer (Borneo), *Johorella* Roewer (Malaya), *Kondosus* Roewer (Borneo), *Metatithaeus* Suzuki (Borneo), *Metazalmoxis* Roewer (Seychelles), *Parazalmoxis* Roewer (Kenya), *Peltamma* Roewer (Sumatra), *Remyus* Roewer (Madagascar), *Seblatus* Roewer (Sumatra), *Spalicus* Roewer (New South Wales), *Sterrhosoma* Thorell (Sumatra), *Tithaeomma* Roewer (Burma), *Tithaeus* Thorell (Burma, Thailand, Malaya, Singapore, Sumatra, Krakatau, Java, Borneo, Sarawak, Timor) and *Zalmoxida* Roewer (New Guinea).

The following African 'Phalangodinae' genera belong in a new family still to be described: *Aburiplus* Roewer (Ghana), *Conomma* Loman (Guinea-Bissau, Ghana, Togo, Cameroon, Fernando Poo, Principe I., Annobón I., Zaïre, Angola, ?Tanzania), *Metaconomma* Kauri (Zaïre), *Microconomma* Roewer (Cameroon), *Micronimba* Roewer (Ivory Coast), *Nimbadus* Roewer (Ivory Coast), *Opconomma* Roewer (Sao Tomé Is.), *Opconommula* Roewer (Cameroon), *Proconomma* Roewer (Zaïre), *Pyramidops* Loman (Togo, Cameroon, Fernando Poo, Gabon, Zaïre) and *Tonkouinatus* Roewer (Ivory Coast). The position of *Kwangonia* Kauri from Zaïre and *Tetebius* Roewer from Mozambique is uncertain, but they may belong in a group close to the Assamiidae.

Biantidae—*Hinzuanius*

There has been confusion regarding the status of some African, especially Malagasy and other insulan genera and species of Biantidae. The oldest available name in this group is *Hinzuanius* Karsch, 1880 to which are assigned the following species (according to their revised types):

H. insulanus Karsch, 1880 (type-species)—Comoro Is. [holotype: '*Hinzuanius insulanus* Karsch, Type, Anjouani, Hildebrdt.', ZMB 2551—♂],

H. africanus Pavesi, 1883—Ethiopia [holotype: '*Hinzuanius africanus* Pavesi. TYPE. Let Marefiá. ix. 1888 (sic!) O. Antinori', MCSN—♀],

H. bicolor (Pocock, 1903)—Sokotra [syntype: '*Biantidius bicolor* (Poc.). ex Typus. Sokotra', SMF R II/7399/35—♂]. Described in *Biantes*, transferred to *Hinzuanius* by Roewer (1912), but later removed; probably = *H. flaviventris* (Pocock, 1903),

H. comorensis (Roewer, 1949), **comb. n.**—Comoro Is. [syntypes: '*Biantica comorensis* Rwr. Komoren: La Grille', SMF R II/1565/21—2♂, 3 ♀],

H. gracilis (Roewer, 1949), **comb. n.**—Madagascar [syntypes: '*Biantula gracilis* Rwr. Madagaskar: Marie', SMF R II/1563/19—1 ♂, 2 ♀] (syn.: *Acrobiantes nigroannulatus* Lawrence, 1959, **syn. n.**), *H. madagassis* (Roewer, 1949), **comb. n.**—Madagascar [syntypes: '*Biantica madagassis* Rwr. Madagaskar: Bai Antongil', SMF R II/1562/18—5 ♂, 2 ♀, 1 j],

H. mauriticus Roewer, 1927—Mauritius (see above),

H. parvulus Hirst, 1911—Seychelles [syntype: '*Biantes parvulus* (Hirst), ex Typ. Seychellen: Praslin', SMF R I/256—♀],

H. vittatus (Simon, 1885), **comb. n.**—Madagascar [syntype: '*Acrobiantes vittatus* (Sim.). Madagaskar: Nossi Bé. Typ. Simon ded.', SMF R I/982—♀] (syn.: *Hinzuanius hildebrandti* Roewer, 1912, **syn. n.**, *Hovabiantes immaculatus* Lawrence, 1959, **syn. n.**, *Hovabiantes simplicidens* Lawrence, 1959, **syn. n.**, *Hovabiantes vachoni* Lawrence, 1959, **syn. n.**). [The type-specimens of *hildebrandti* have been examined: '*Hinzuanius hildebrandti* W. Soer.* Madagaskar Hildebrandt' '*Hinzuanius hildebrandti* Roewer, 1912—1 ♂, 1 ♀ Syntypen. NW Madagaskar, Hildebrandt leg.', ZMB 3795—♂ (lectotype), ♀ (paralectotype); also numerous series from SMF det. by Roewer.]

There are some further species from Madagascar, which should also be placed here, but whose types were not studied (names in original combinations):

Acrobiantes littoralis Lawrence, 1959,

Biantes milloti Fage, 1946,

Acrobiantes pardalis Lawrence, 1959 (syn.: *Acrobiantes brevispinus* Lawrence, 1959, **syn. n.**, *Acrobiantes minor* Lawrence, 1959, **syn. n.**),

Hovabiantes pauliani Lawrence, 1959 (syn.: *Biantes scaber* Lawrence, 1959, **syn. n.**),

Biantes tenebrosus Lawrence, 1959.

As a result of my study some generic names must fall into the synonymy of *Hinzuanius*:

Acrobiantes Roewer, 1915 (type-species *Biantes vittatus* Simon, 1885), **syn. n.**,

Biantica Roewer, 1949 (type-species *Biantica comorensis* Roewer, 1949), **syn. n.**,

Biantula Roewer, 1949 (type-species *Biantula gracilis* Roewer, 1949), **syn. n.**,

Biantidius Roewer, 1949 (type-species *Biantes bicolor* Pocock, 1903), **syn. n.**,

Hovabiantes Lawrence, 1959 (type-species *Biantica comorensis* Roewer, 1949)—objective synonym of *Biantica*; **syn. n.**

An unsolved problem is the mutual relation between the genera *Hinzuanius* and *Biantes* Simon, 1885 (with several species from South-East Asia; type-species *Biantes longimanus* Simon, 1885)—they probably belong together.

Assamiidae

The systematic position of the genus *Maccabeesa* Roewer will only be resolved when a male of its single species is available. It was originally placed in the Erecinae, but all the Assamiidae require redefinition, because the previous division into 18 subfamilies (Roewer 1935, Kauri 1985) is artificial and does not reflect natural relationships. My revisionary work on African members of the family has revealed that there are two distinct groups (maybe at family level), which do not correspond with the existing subfamilies. The revision is, however, far from complete.

Gagrellinae

The hitherto existing system of the Gagrellinae-Leiobuninae complex is highly unsatisfactory and badly needs thorough examination. Criteria used for the separation of genera are inadequate and the main characters often variable, eg. the number of noduli on the femora of legs. The structure of the genital organs is still used only for species characterisation and not for delimitation of higher taxa. Moreover there are some nomenclatural problems in the Gagrellinae, one being of crucial importance: the genus *Gagrella* Stoliczka, 1869, the largest in the subfamily, has no type-species, because the two originally included species (*G. atrata* Stoliczka and *G. signata* Stoliczka) were carelessly removed to other genera (*Melanopa* Thorell and *Crassicippus* Roewer respectively) by Roewer (1910) and his proposal to designate *G. feae* Thorell, as 'Typus' (1923: 952) is invalid.

Under these circumstances I leave *Strandia ceylonensis* where it has been previously placed not intending to make any revision of Gagrellinae, though I am aware, that the differences between the genera *Strandia* Roewer, 1910 and *Crassicippus* Roewer, 1910 are probably non-existent using Roewer's diagnoses.

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